Spot Safety Project Evaluation

Project Log # 200512146

Spot Safety Project # 07-97-210

Spot Safety Project Evaluation of the Installation of a Traffic Signal at the Intersection of SR 2565 (Hicone Rd) And SR 2819 (McLeansville Rd) Guilford County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 3/20/2006
Brad Robinson, EI Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-97-210 – The Intersection of SR 2565 (Hicone Rd) at SR 2819 (McLeansville Rd) in Guilford County.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis has been completed to measure the effectiveness of the spot safety improvement. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a fully actuated traffic signal. SR 2565 (Hicone Rd) and SR 2819 (McLeansville Rd) are both two-lane facilities with no turn lanes at the subject intersection. SR 2565 has a speed limit of 45 mph and SR 2819 has a speed limit of 35 mph at the subject location due to being in a school zone. The subject location is a four-leg intersection, which was controlled by stop signs on SR 2819. Northeast High School is located in the northeast quadrant of the intersection.

The original statement of problem was that increasing volumes at the intersection made it unsafe for vehicles to enter the intersection from the side streets, therefore causing delay and the choosing of inadequate gaps. The intersection met MUTCD Traffic Signal Warrant 9 – Four Hour Volumes.

The initial crash analysis was completed from May 1, 1994 to March 31, 1997 with a total of 15 reported crashes. These included 4 Angle Crashes and eight 8 Rear-End Crashes. The final completion date for the improvement at the subject intersection was on December 15, 1998 with a total cost of $35,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from November 1, 1998 through January 31, 1999. The before period consisted of reported crashes from March 1, 1992 through October 31, 1998 (6 years and 8 months) and the after period consisted of reported crashes from February 1, 1999 through September 30, 2005 (6 years and 8 months). The

ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Rear End Crashes were the target crashes for the applied countermeasure.

Treatment Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Total crashes	36	13	-63.9
Total Severity Index	10.4	2.71	-73.9
Target Crashes	22	5	-77.3
Target Crashes Severity Index	14.36	3.96	-72.4
Volume	5600	7800	39.3
Injury Summary			
Fatal injuries	0	0	N/A
Class A injuries	4	0	-100.0
Class B injuries	11	0	-100.0
Class C Injuries	25	5	-80.0
Total Non-Fatal Injuries	40	5	-87.5
Total Injuries	40	5	-87.5

The naive before and after analysis at the treatment location resulted in a 63.9 percent decrease in Total Crashes, a 77.3 percent decrease in Target Crashes, a 73.9 percent decrease in the Total Severity Index, and a 39.3 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1995 and the after period ADT year was 2002.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 63.9 percent decrease in Total Crashes and a 77.3 percent decrease in Target Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in both Total Crashes and Target Crashes from the before to the after period.

In addition to the decrease in crashes, there was a sharp decrease in the Severity Index. In the before period there were 3 “A” injury crashes, 5 “B” injury crashes, and 10 “C” injury crashes. In the after period there were only 3 injury crashes in total, all of them “C”.

Referencing the *Collision Diagram*, it is clear that vehicles from both legs of SR 2819 (Mcleansville Rd) were having trouble finding appropriate gaps to enter the intersection. Fifty percent (18 out of 36) of the Total Crashes at this intersection were Frontal Impact Crashes involving a vehicle entering the intersection from SR 2819 and crashing with a vehicle on SR 2565. This pattern has almost disappeared in the after period, with only 2 crashes of this type occuring.

Again referencing the *Collision Diagram,* a Rear-End Crash pattern existed in the before period for vehicles at the stop sign travelling south on SR 2819 (McLeansville Rd). This crash pattern was reduced in the after period, from 6 to 3 (2 plus 1 Ran Off Roadway Crash due to avoiding a stopped vehicle). After reviewing the crash reports, at least 50 percent (3 out of 6) of this crash pattern in the before period was due to the front car starting and then quickly stopping again due to traffic on SR 2565. The traffic signal helped correct this type of motion, therefore reducing the pattern of Rear-End Crashes.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

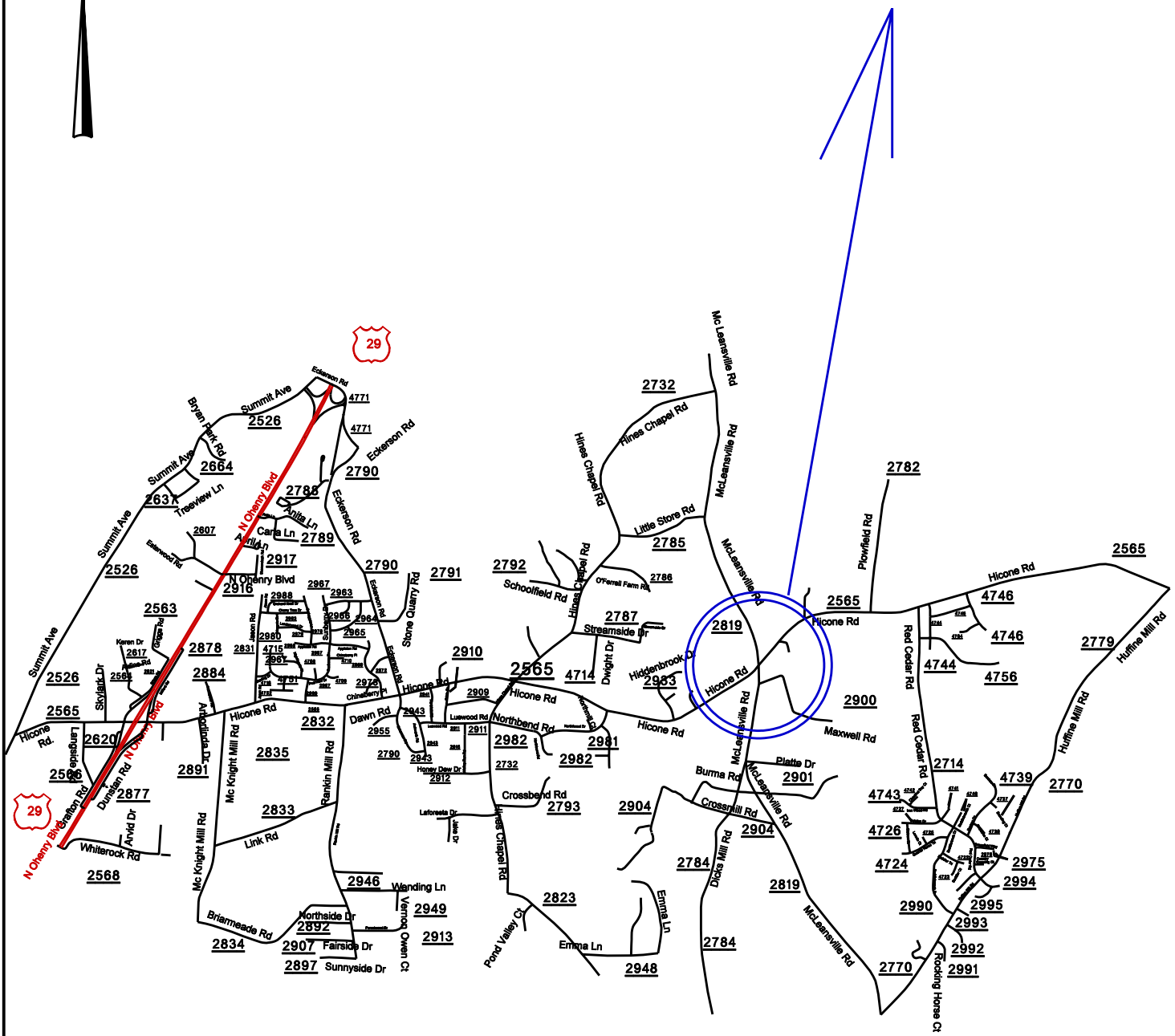
As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Evaluation of Spot Safety Project Number 07–97–210

Location Map, Guilford County

Treatment Site:

SR 2565 /Hicone Rd at SR 2819 /McLeansville Rd



Treatment Site Photos Taken on February 9, 2006

Travelling South on SR 2819 / Mcleansville Rd

Travelling South on SR 2819 / Mcleansville Rd

Travelling North on SR 2819 / Mcleansville Rd

Travelling North on SR 2819 / Mcleansville Rd

Travelling West on SR 2565 / Hicone Rd

Travelling West on SR 2565 / Hicone Rd

Travelling East on SR 2565 / Hicone Rd

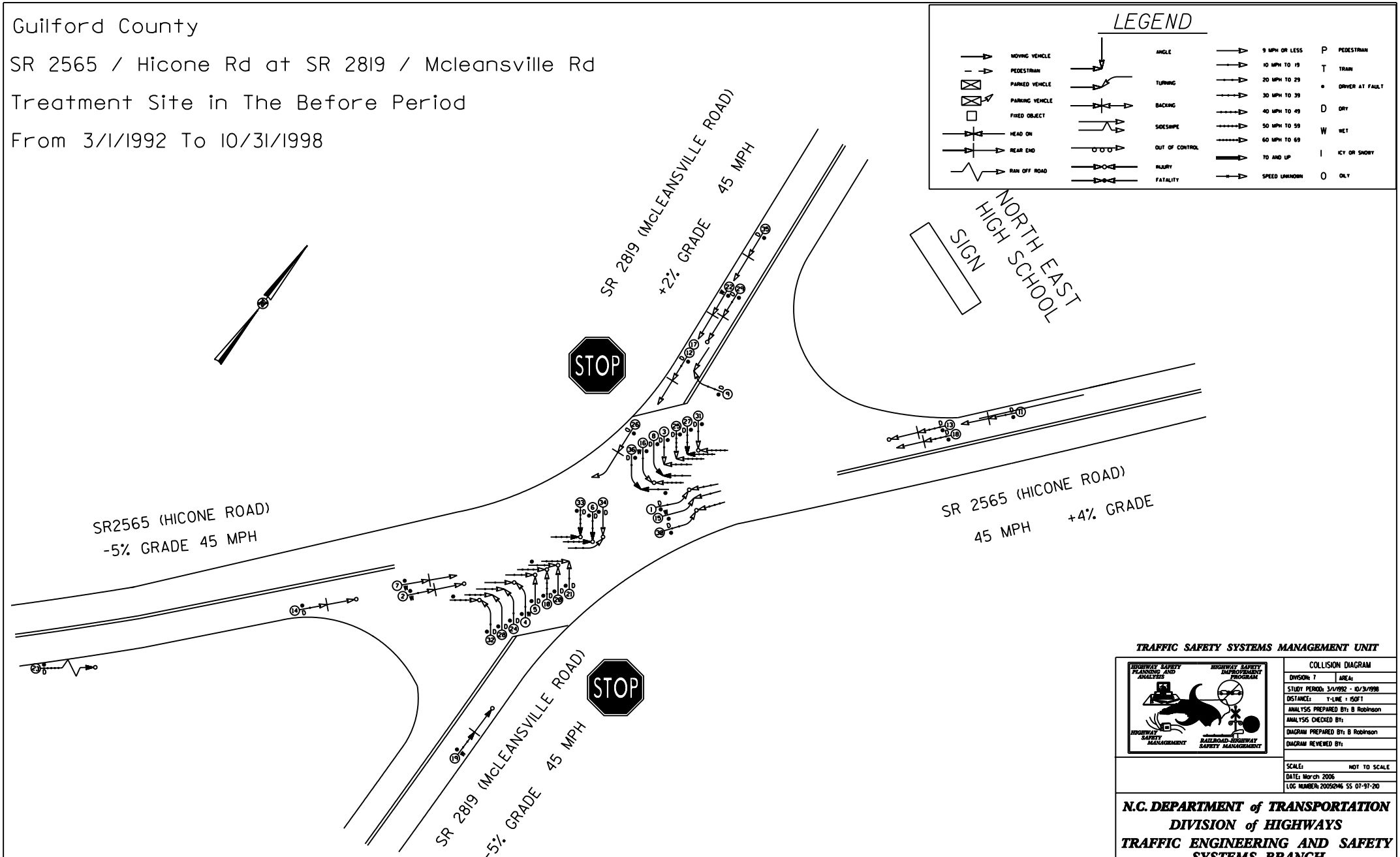
Travelling East on SR 2565 / Hicone Rd

Guilford County

SR 2565 / Hicone Rd at SR 2819 / Mcleansville Rd

Treatment Site in The Before Period

From 3/1/1992 To 10/31/1998



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM	
DIVISION: 7	AREA:
STUDY PERIOD: 3/1/1992 - 10/31/1998	
DISTANCE: Y-LINE : 1501FT	
ANALYSIS PREPARED BY: B Robinson	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: B Robinson	
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE: March 2006	
LOG NUMBER: 20052146 SS 07-97-210	

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

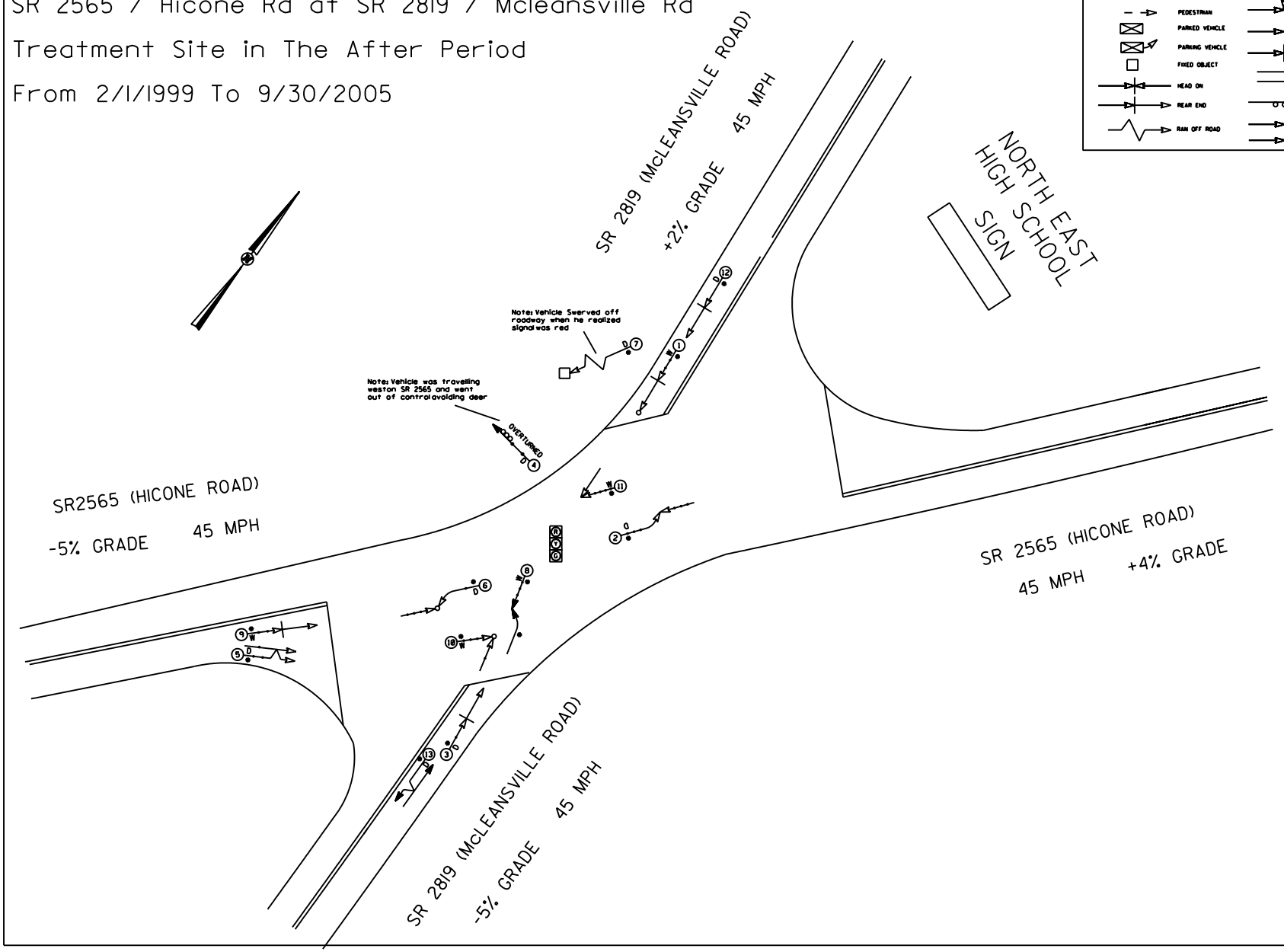
before.dgn 04/27/2006 03:43:54 PM

Guilford County

SR 2565 / Hicone Rd at SR 2819 / Mcleansville Rd

Treatment Site in The After Period

From 2/1/1999 To 9/30/2005



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN

P PEDESTRIAN
T TRAIN
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
O OILY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY PLANNING AND ANALYSIS
HIGHWAY SAFETY IMPROVEMENT PROGRAM
HIGHWAY SAFETY MANAGEMENT
RAILROAD-HIGHWAY SAFETY MANAGEMENT

COLLISION DIAGRAM

DIVISION: 7 AREA:
STUDY PERIOD: 2/1/1999 - 9/30/2005
DISTANCE: Y-LINE = 150FT
ANALYSIS PREPARED BY: B. Robinson
ANALYSIS CHECKED BY:
DIAGRAM PREPARED BY: B. Robinson
DIAGRAM REVIEWED BY:
SCALE: NOT TO SCALE
DATE: February 2006
LOG NUMBER: 20052146 SS 07-97-20

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

after.dgn 04/27/2006 03:47:29 PM